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Robust color histogram descriptors for video segment retrieval and identification.

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Abstract

Effective and efficient **representation** of color features of multiple **video** frames or pictures is an important yet challenging task for visual information management systems. Key frame-based methods to represent the color features of a group of frames (GoF) are highly dependent on the selection criterion of the representative frame(s), and may lead to unreliable results. We present various histogram-based color descriptors to reliably capture and represent the color properties of multiple images or a GoF. One family of such descriptors, called alpha-trimmed average histograms, combine individual frame or image histograms using a specific filtering operation to generate robust color histograms that can eliminate the adverse effects of brightness/color variations, occlusion, and edit effects on the color **representation**. We show the efficacy of the alpha-trimmed average histograms for **video** segment retrieval applications, and illustrate how they consistently outperform key frame-based methods. Another color histogram **descriptor** that we introduce, called the intersection histogram, reflects the number of pixels of a given color that is common to all the frames in the GoF. We employ the intersection histogram to develop a fast and efficient algorithm for identification of the **video** segment to which a query frame belongs. The proposed color histogram descriptors have been included in the ISO standard **MPEG-7** after extensive evaluation experiments.

Descriptors

FEATURE-EXTRACTION; IMAGE-COLOUR-ANALYSIS; **IMAGE-REPRESENTATION**; IMAGE-RETRIEVAL; IMAGE-SEQUENCES; STATISTICAL-ANALYSIS; **VIDEO-DATABASES**; **VIDEO-SIGNAL-PROCESSING**.

Classification codes

B6135 **Optical**-image-and-video-signal-processing*;
B0240Z Other-topics-in-statistics;
C5260D **Video**-signal-processing*;
C6160S Spatial-and-pictorial-databases;
C7250R Information-retrieval-techniques;
C1140Z Other-topics-in-statistics.

Keywords

robust-color-histogram-descriptors; **video**-segment-retrieval; **video**-segment-identification; **color**-features-representation; **video**-frames; visual-information-management-systems; key-frame-based-methods; group-of-frames; selection-criterion; color-properties; **video**-sequences; data-structure; alpha-trimmed-average-histograms; color-**representation**; **video**-segment-retrieval-applications; intersection-histogram; pixels; efficient-algorithm; fast-algorithm; query-frame; ISO-standard; **MPEG-7**.

Treatment codes

T Theoretical-or-mathematical;
X Experimental.

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Search Strategy

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1	INZZ	mpeg-7 AND descriptor AND representation AND video	unrestricted	10

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